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Cooperative Extension and Electronic Technology--New Initiatives in Information Delivery, Educational Delivery, and Problem Solving

The integration of new information technologies with Extension's traditional program delivery methods is one of our system's current challenges. The technology is changing, and so is our clientele. Our vast knowledge base keeps growing, and so does our desire to share it.

This report is a snapshot of the Cooperative Extension System's use of new techniques for disseminating this knowledge base. A June, 1985 survey shows rapid and dramatic growth of a modern electronic delivery network. How we are working with the private sector, combining efforts with other USDA agencies, and implementing "cutting edge" innovations are some of the topics we are exploring here. It is exciting to see the steps we have taken, and to view the entire system from this electronic technology perspective.

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COOPERATIVE EXTENSION AND ELECTRONIC TECHNOLOGY -- NEW INITIATIVES IN
INFORMATION DELIVERY, EDUCATIONAL DELIVERY, AND PROBLEM SOLVING

During the fall of 1981, the first Extension Service/Extension Committee
on Organization and Policy (ES/ECOP) Task Force on Computer Usage was
formed. Its charge was to:

> ** Examine computer usage in the Extension Service;
> ** Examine policies relevant to that usage; and,
> ** Probe the development of a national plan for electronic media
>   use by Extension.

At that time, three states in the Cooperative Extension System (CES) had
acquired microcomputers for 100 percent of their county and regional
offices. Kentucky was testing the Green Thumb videotext information
delivery system for farmers. A few computer networks, accessing mainframe
computers at the land grant universities, were in their early stages:
AGNET in Nebraska, CMN in Virginia, FACTS in Indiana, and TELFARM and
TELPLAN in Michigan. The first regional computer group, the North Central
Computer Institute at Madison, Wisconsin, was less than one year old.

Today, during the summer of 1985, less than four years later, twenty-nine
states have microcomputers in 100 percent of the county offices. Computer
software has and is being developed and utilized to enhance Extension's
capabilities in the functional areas of:

> ** Information delivery:
> ** Education delivery; and,
> ** Problem solving.

I. STATES SURVEY OF ELECTRONIC TECHNOLOGY USES AND DEVELOPMENTS

The state land grant university Extension Services in the fifty states,[1]
including the District of Columbia, supplied responses during July, 1985
to a brief questionnaire on electronic technologies' usages. Conducted
through the ES-USDA electronic information and messaging network, the
speed of the survey delivery and responses is itself a good example of how
the technology is being used to communicate information rapidly and
effectively. Results are summarized in the tables below and in selected
narratives of Extension accomplishments and ongoing projects. The
percentage of microcomputer-equipped county offices in numeric form is
shown in Table 1; the same data in map form is shown in Table 2. The
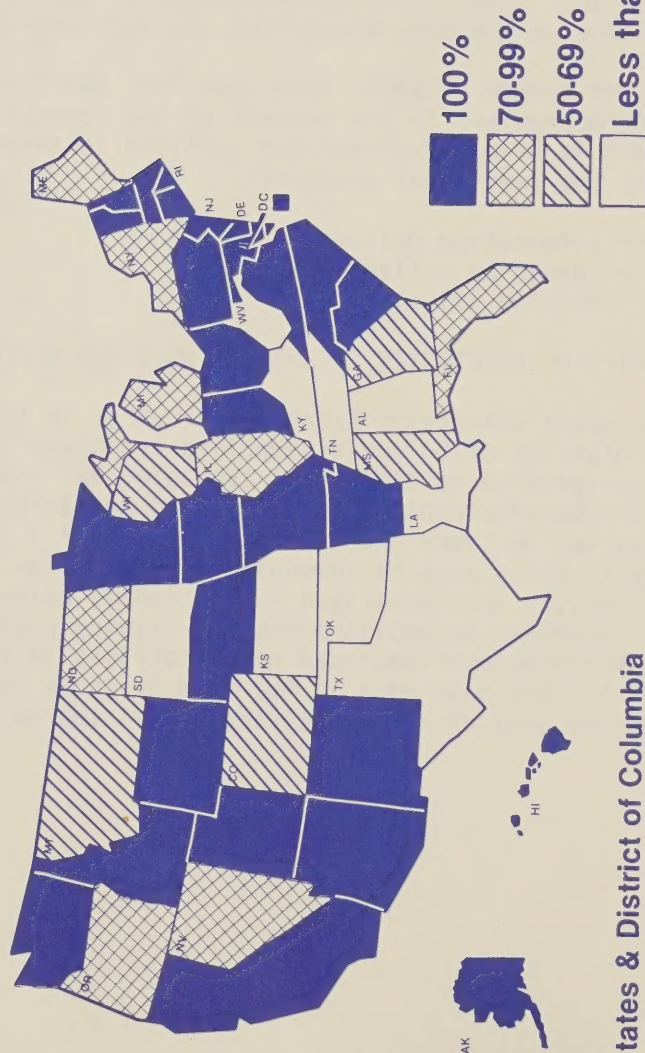reported Extension uses of microcomputers are listed in Table 3.

1/ Extension Services in American Samoa, Guam, Micronesia, Puerto Rico,
    and the Virgin Islands were not included.

TABLE 1.

PERCENTAGE OF MICRO-EQUIPPED COUNTIES: NUMBER OF STATES

100% : 29	40-49% : 1
90-99% : 3	30-39% : 2
80-89% : 2	20-29% : 3
70-79% : 3	10-19% : 2
60-69% : 1	1-9% : 2
50-59% : 3	0% : 0

TABLE 2

Cooperative Extension System
Modern Electronic Delivery Network*

100%
70-99%
50-69%
Less than 50%

*50 states & District of Columbia

TABLE 3

PRIMARY EXTENSION USES OF MICROCOMPUTERS

Bulletin Boards

Clientele Education

Clientele/Extension Staff Training

Communication w/Timesharing Networks

Database Management

Decisionmaking Support

Electronic Messaging

Electronic Spreadsheets

Mailing List Management

Office Administration

Problem–Solving Software

Recordkeeping

Remote Batch Job Submissions

Remote Diagnostics

Software Development

Word Processing

II. ENHANCING AGRICULTURAL PROFITABILITY

No group in the United States has so widely supported the use of microcomputers on-farm for enhancing farm profitability and management than the Extension professional. Microcomputers were acquired by innovative farmers and ranchers for on-farm use in the early 1980's. Current indications show that about 6-8 percent of all farms presently have microcomputers, and that the farms that do have microcomputers account for a large proportion of the value of farm sales.

State Extension Services report that United States farmers and ranchers are more knowledgeable about production agriculture than about the business management sides of farming. This situation has limited the ability of producers to cope with the current economic crisis in agriculture. It has also given Extension specialists a rare opportunity to interest and teach new business and decision-making skills to agricultural producers.

Just a few of the microcomputer projects which are now in use, having been developed and diffused by Extension specialists are highlighted here.

A. "DD50" Computerized Rice Management

University of Arkansas Cooperative Extension Service specialists, in cooperation with University of Arkansas rice researchers and the U.S. Department of Commerce National Oceanic and Atmospheric Administration Weather Service, have developed a centralized computer system using weather data to predict growth stages of rice. Called "DD50" (a term used to measure the thermal quality of a growing day), the program estimates how much rice plant growth is likely, based on historical extremes of temperature on a given day, in a given location.

The program is accessible from microcomputers and terminals in Arkansas' county Extension offices. Producers supply only the rice variety name and the date of emergence of the germinating seedlings. "DD50" provides predicted dates for eighteen stages of rice growth with an accuracy of plus or minus two days. The system has grown, in the past five years, from usage by 540 rice producers, to usage by more than 2500 rice producers representing more than a half million acres of rice. This year, "DD64" was married to "DD50" to predict rice water weevil flights, and to issue an alert when infestation risk coincides with a vulnerable stage in the rice crop's growth.

B. The Year 2000 Computerized Farm

The Texas Agricultural Extension Service and the Texas Agricultural Experiment Station of Texas A&M University have begun to set up the "farm of the future." Exemplifying public and private sector cooperation, the project is supported by funding from the Kellogg Foundation, a major computer firm, the Stiles Farm Foundation, numerous agricultural software vendors, and a tractor from a major farm implement firm.

The "year 2000 computerized farm" project involves development of a computerized information system on a large, 3300 acre, commercial-sized farm. Included is a training center for farmers, ranchers, and Extension staff. Three-day courses are held in farm and ranch accounting, beef cattle performance record-keeping, and other computerized farm management practices. It is one of the first efforts in the country to apply and demonstrate on-farm microcomputer technology. This in-depth education project utilizes the full potential of the on-farm computer.

C. FINPACK: Extension Framework for Individual Farm Decision-Making

Designed to be used as a tool by farm managers in farm planning, financing, and analysis, FINPACK is a set of four computer programs, FINAN, FINLRB, FINTRAN, and FINFLO. It was developed by the University of Minnesota Agricultural Extension Farm Management staff and is currently used by the University of Minnesota Extension Service and the Cooperative Extension Services in an expanding number of other states.

FINPACK provides an analysis of last year's farm performance, analyzes and compares three alternative long range farm plans, projects monthly cash flows for the farm business for the coming year, and projects the farm cash flow for three years of business. The FINTRAN program is most useful in projecting cash flows for a transitional period when a major change is being implemented.

The output of the programs shows financial soundness of alternatives (FINLRB), projected cash inflows and outflows for a three year transitional period (FINTRAN), comparisons of actual cash transactions with computerized program projections (FINFLO), and measures of profitability for the past year (FINAN). A fifth program, FINANX, is in development and will give measures of profitability in addition to a comparative trend analysis.

When used together, the FINPACK programs give farmers and ranchers much improved record-keeping and financial analysis capability. They also serve as a very effective educational tool, by teaching financial concepts through their application on individual farms.

D. Peach Pricing with Computers

Peach growing in New Jersey is a major agricultural activity. Annual production averages nearly 2-1/2 million bushels. Annual crop value for 1983 exceeded $20 million. Most peaches are sold fresh during a relatively short marketing season.

New Jersey peach producers and dealers needed current marketing and timely peach movement information; and they needed this information on a daily basis.

The New Jersey Peach Promotional Council appointed a computer committee of Extension marketing specialists and researchers from the Department of Agricultural Economics and Marketing at Rutgers to assist in developing plans for the marketing season. The computer program which ensued was designed as an industry self-help venture,

open to all commerical peach growers and other marketers.

On a daily basis, marketers use a toll-free telephone number to provide information to the peach pricing data base. Each subscriber supplies six variables: the date, an I.D. number, peach sales by major varieties, point of sale, total number of boxes sold, and prices received for each category sold. Later in the same day, growers call in to receive a summary of the day's price and volume averages. New Jersey Cooperative Extension reports three major lessons that have been learned from this project:

      ** Computer systems must be "user friendly".
      ** The key of broad base support for a system is a simple understanding of what it can do, and how it works.
      ** Nothing sells an idea faster than the people in a business or industry who believe in it.

E. The ProSeries

Crop production is defined as a series of production decisions made before, during, and after the growing season. These decisions relate to variety selection, fertility, tillage, insect control, weed control, irrigation, marketing, and financing. And, as producers know from experience, these decisions can not be made independent of one another.

To provide producers with an aid for analyzing production choices, professionals in the Kansas Cooperative Extension Service are developing the ProSeries, an integrated software system for use on microcomputers. At the core of the system is a piece of software called the "shell" which connects individual program modules so that they are interactive.

The "shell", first designed to address corn production decisions, also serves as a ready skeleton for additional systems tailored to producing other commodities. Recognizing the chance to adapt CORNpro for wheat producers, Kansas State Cooperative Extension workers now are developing WHEATpro, which will contain about 12 production and marketing modules. The information in the modules is being drawn from a large group of Extension specialists from the Kansas State University Departments of Agricultural Engineering, Agronomy, Plant Pathology, Entomology, and Agricultural Economics.

Work on CORNpro is being accomplished with support funding from the Kellogg Foundation. WHEATpro work is being supported by funding from the Extension Service, USDA. Also on the drawing board is BEEFpro, a livestock production decision aid in the ProSeries, which promises to be an important farm management aid and eductional tool for use by Extension staff and by individual producers.

III. YOUTH, HOME, AND FAMILY

A. Dramatic Increase in 4-H Computer Involvement

The use of computers in 4-H programs with youths aged 9-19 has
increased substantially in the first half of the 80's.

In 1980, 3000 youth were enrolled in 4-H computer projects. By 1983,
the figure had jumped to 19,600. Participation by boys and girls was
almost equal: 9945 boys and 9656 girls. The year 1984 saw a 150
percent increase of enrollment of 47,286 young 4-H participants in
computer projects. Program activities included energy consumption and
conservation, nutrition and fitness, gardening, dairy and livestock,
meteorology, consumer decisions, and clothing.

Six youngsters enrolled in the Colorado Cooperative Extension Service
4-H club developed a computer program to catalog an El Paso County
livestock sale. With the help of employees from a major computer
firm, the 4-H'ers developed computer programming skills to write a
sale program that would keep track of buyer and seller information at
the livestock auction. Even with a temporary halt to the operation
due to a power surge, the majority of the auction was conducted
electronically.

B. Home Economics, Human Nutrition, and Family Needs

In Missouri, as in many other states, the Cooperative Extension
Service has developed a Tel-A-Line service that provides tips on home
economics topics twenty-four hours a day. Computer software has been
developed to extend programs in Missouri covering topics of energy,
nutrition, housing and interior design, family financial planning, and
life insurance.

In Minnesota, where residential energy usage continues to a major
economic concern, residents can call upon Extension agents to assess
the use of alternative energy systems and discover the life-cycle
savings of replacing current systems with new ones.

The Alabama Cooperative Extension Service has developed a computer
program to assess various high risk health factors for its clientele.
Analyzing the health habits of the individual, the computer provides a
printout to be used as a motivational tool to make changes to improve
chances for a longer, healthier life.

NUTRI-II, a computerized dietary evaluation program developed by the
Purdue Cooperative Extension Service, helps individuals to understand
nutritional needs through analysis of daily menus. The program
prompts the user for a minmun amount of personal information, such as
age, sex, height, and frame size. Using this data, plus the user's
choice of meal menu selections, the program gives suggested body
weight, recommended nutrient intake, and quantity of nutrients
actually being provided.

C. Community and Rural Development

Many Cooperative Extension Services report highly successful community programs for training on microcomputers. Working with the Rural Development Centers, the Extension specialists offer sessions ranging from one hour to two days. Often the sessions are attended by county commissioners and city officials, all interested in learning what microcomputers are and what they can do.

The Texas Cooperative Extension Service writes that software has been and is being developed for community development in two areas: decision aids and impact assessments. The decision aids are being prorammed to assist with community services budgeting involving sewage management, water management, and fire protection. The impact assessment programs analyze and evaluate the impact on the community of industrial development, and of tourism.

IV. ES-USDA SPECIAL PROJECTS IN ELECTRONIC TECHNOLOGY

Not satisfied with exploring and using only the computer dimension of the new technologies, Extension personnel are examining all possibilities of electronic microchip media to see what has potential for better, faster, more efficient and more useful outreach. State Extension Services are using and developing whatever tools are needed to inform, educate, and problem solve, taking advantage of hardware availability and expertise on the land grant campus.

Many interesting projects are in progress. Responses from the States on involvement in the different forms of electronic technology are shown in Table 4, including the microcomputer projects already discussed. Along with the table are a few selected narratives of ES-USDA special projects which represent unique applications of the technology.

A. Artificial Intelligence and Expert Systems

Through a cooperative agreement with Purdue University, the Science and Education agencies of USDA have funded a project to evaluate the forthcoming role of artificial intelligence (AI) and expert systems in the Food and Agricultural Science System. Working with a multi-agency steering committee of Extension Service, Agricultural Research Service, and National Agricultural Library members, a panel of thirty experts convened by Purdue is developing information necessary to assist policy makers and decision-makers in the food and agricultural science and education system in assessing potential program strategies for the application of AI concepts and approaches.

The Purdue panel will examine such expert systems as PLANT/ds and PLANT/tm, two University of Illinois developments which diagnose soybean disease and provide turf-grass management, respectively. Among the AI areas being examined for applicability to science and education functions are natural language processing, image processing, robotics, machine learning, automated programming, and expert systems.

TABLE 4
INNOVATIVE CES MEDIA USAGE: HIGH BENEFIT APPLICATIONS

INNOVATIVE MEDIA USAGE	HIGH BENEFIT APPLICATIONS		
	INFORMATION DELIVERY	EDUCATIONAL DELIVERY	PROBLEM SOLVING
Audio/Video Teleconferencing	*	*	*
Cable TV (Broadcasting & Line 21)	*		
Commerical Timesharing Networks			*
Commerical TV (Broadcasting)	*		
Computerized Bulletin Boards	*		
Interactive Videodisc	*	*	*
Microcomputer Packages		*	*
Optical Character Reader	*		
Satellite Broadcasting	*	*	

B. Extension Accountability and Evaluation Online

Using the ES-USDA electronic information and messaging system, and its
network of 1300+ users throughout the Cooperative Extension System,
specialists in Washington, DC created an avenue of communication for
submission and review of Extension Plans of Work and Narrative
Accomplishment reports. With a combination of technology employing
optical character recognition, word processing, and commercial
timesharing, CES accountability and evaluation (A&E) records of
project accomplishments and future plans are available through keyword
searches to all CES personnel.

The A&E system provides brief descriptions of past and future
programs, names of contacts, measures of productivity for each
project, and numbers of clientele served. State Extension offices at
the land grant universities have the option of submitting their
information electronically, on microcomputer diskettes, or in hard
copy format. Information is reviewed electronically by comprehensive
review teams of specialists in Washington, DC. Summaries of
information and trend analyses are prepared to aid administrators and
managers in planning and projecting programs.

C. The Interactive Videodisc Extension Network (IVEN)

Recognizing the enormous potential for information delivery,
educational delivery, and problem solving through a single
standardized medium, ES-USDA has negotiated a cooperative agreement
with the University of Nebraska to pilot the development of an
interactive videodisc system.

The two-year effort, targeted to provide assistance to financially
distressed farm families, anticipates the production of a videodisc,
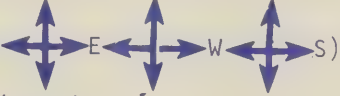containing:

    ** An interactive training session with pre-test, post-test,
        and multiple branching options;
    ** "How-To" segments on cash flow planning and projections; and
    ** Interactive diagnostic/simulation farm management
        sections on the disc.

In Idaho, the Cooperative Extension Service has developed an
interactive videodisc/microcomputer system to trouble-shoot and
diagnose a two-cycle engine, to demonstrate management practices for
newborn pigs, and to provide an information/post-test cycle on the
Dairy Herd Improvement Program. The Minnesota Cooperative Extension
Service is involved in planning a videodisc that will interactively
help clients and students to calculate harvest loss. The National
Agricultural Library, in another pilot effort, has placed the entire
contents of the Pork Industry Handbook (text and illustrations) on a
laser videodisc.

D. Computerized Research Results

Using the ES-USDA electronic information and messaging network, the
Extension Service, the Agricultural Research Service (ARS) and
Cooperative Extension Services in Arizona, Florida, Missouri, North
Dakota, Pennsylvania and South Carolina have developed the Research
Results Data Base (RRDB). Still in the pilot test stages, the RRDB
contains one-page summaries of ARS research reports, judged by ARS/ES
specialist to be practical and applicable for Extension education
use.

The data base can be searched and accessed by keywords, using computer
terminals with communications capabilites. Transfer of information
about ongoing research projects is rapid and occurs through the
cooperative efforts of the research and extension communities. Pilot
test users have said that this project speeds the transfer of ARS
research results to Extension specialists by as much as a year.
Traditional sources for this kind of information are professional
journals and scientific meetings. Expansion of the RRDB could include
additional research results from other USDA agencies and other
government departments.

V. REGIONAL COMPUTER ORGANIZATION (N←↕→E←↕→W←↕→S)

A. North Central Computer Institute (NCCI)

The North Central Computer Institute began its operation in 1981, with
offices on the University of Wisconsin campus at Madison. NCCI was
funded with a gradually accelerating plan of support from the
Extension offices in the North Central states, and gradually
decelerating support from the Kellogg Foundation, over a five and
one-half year period. The five major Institute objectives are to:

   ** Facilitate the development of multi-state and
      multi-disciplinary computer software.
   ** Facilitate inter-institutional sharing of computer
      software.
   ** Develop and disseminate regional data bases.
   ** Sponsor and facilitate educational services, techniques
      and products to be used to train individuals in reserach,
      extension and teaching at member institutions.
   ** Develop and maintain expertise on technical products,
      services and applications, and to advise and assist member
      institutions in evaluating their Information Services
      alternatives.

Since its inception, NCCI has initiated a Staff Paper Series on such
topics as administrative policy issues, electronic technologies
agricultural applications, and microcomputer software and hardware

evaluation. NCCI publications are being disseminated to national and international target audiences. Workshops, seminars, and training sessions are held at the Madison campus involving Extension personnel invited speakers from outside the region, and visiting international scholars. NCCI, among its many activities, also provides a bulletin borad system, a Software Journal, and a highly demanded quarterly newsletter.

B. Northeast Computer Institute (NECI)

Two years after the successful initiation of the North Central Computer Institute, the Northeast Computer Institute opened its doors in State College, PA, at Pennsylvania State University. With a similar five-year plan for funding from the Kellogg Foundation and the Cooperative Extension Services at the Northeast land grant universities, NECI's initial activity was to survey faculty, specialists, and staff of the member instutions to determine software needs and to establish regional software priorities.

NECI stresses three main objectives for the region which it supports:

   ** To facilitate the development and general availability
      of high-quality computer programs for use by the
      Northeast Region institutions.
   ** To facilitate the training of member institution
      personnel on the use of computers in their professional
      activities.
   ** To provide a two-way communications vehicle for collecting
      and disseminating information about computer adoption
      activities, internal and external to the region.

In addition to software evaluation and distribution, a software directory, and the publication of a quartely newsletter, NECI is working closely with its host state on the Pennsylvania Computerization Project. With the assistance of a $1.9 million special allocation from the State of Pennsylvania, the Extension Computer Service (ECS) was established on July 1, 1984. In consultation with NECI, the ECS has allocated microcomputers, training and support to each of the 36 county and regional Extension offices in Pennsylvania.

C. Western Computer Consortium (WCC)

After a one-year study and visits to the Western Region land grant institutions by the Western Region Computer Applications Study Team, the Western Region Extension Directors voted to approve the recommendation of the establishment of a Western Computer Consortium.

Funded by the Western States' Cooperative Extension Services and the Kellogg Foundation for the next five years, WCC is designed to keep member institutions informed about computer software and hardware, meetings, and faculty with computer expertise in various areas of agriculture and home economics. The Consortium began its activites during October, 1984, located at the University of Arizona at Tucson. Its plans are to develop inventories of software, data bases, consultants, and sources of information, and to help set guidelines

for software standards and compatibility.

WCC is publishing a regional newsletter, and plans to implement a region-wide computerized bulletin board system using the ES-USDA nationwide electronic information and messaging service.

D. Southern Regional Computer Coordination

Directors of the Southern Region Cooperative Extension Services agreed at their meeting at the 1983 Land Grant Conference that the coordination of future development of computer support and reduction in duplication of effort would be strengthened by the employment of a Southern Regional Computer Coordinator. As a result, beginning July, 1985, the position was filled and is located at the Georgia Cooperative Extension Service in Athens. Supervised by the Director of Georgia Extension in cooperation with a steering committee of five Extension employees, the Southern Regional Coordinator will have the following main responsibilities:

** Provide liaison among cooperating state Extension and research units and facilitate information dissemination concerning the computer efforts of each cooperating organization.
** Coordinate maintenance of the University of Florida/Virginia Tech Computer Software Library.
** Supervise preparation of a newsletter to provide up-to-date information on new computer programs, new computer training opportunities, new developments in the computer field, personnel changes as they relate to computer software development, and computer program highlights.

Other responsibilities include interfacing with related groups, seeking outside funding, writing an annual progress report, and developing a budget plan.

VI. SELECTED ACCOMPLISHMENTS, PLANNED AND ONGOING ACTIVITIES

State Extension Service survey responses to ES-USDA indicated a range and variety of activites in the electronic technology arena. Some are summarized here to show the use of the different media:

** Alabama Cooperative Extension is using direct input to the major newspapers across the state via computer hookup. Radio stations with capability to be accessed by computer are also included in the linkage.

** Arizona Cooperative Extension is planning a two-way two-channel video up and down satellite link system with one of the experimental farms to make the farm into a centralized, state-wide conference center.

** Colorado Cooperative Extension has "Nutri-Fit," a computerized dietary analysis that includes exercise and calorie levels.

** "Extension Cords", the Pinellas County, Florida, Cooperative Extension Service cable production, features 30-minute programs dealing with agriculture/horticulture, home economics, marine science, and 4-H youth activities.

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**   The Hawaii Cooperative Extension Service is actively pursuing the use of interactive TV for Extension programming.

**   The Agricultural Infodata Service was started by the Iowa Cooperative Extension Service in 1982 and now serves almost 9000 users with closed caption information on markets, weather, and integrated pest management data.

**   The Maryland Cooperative Extension Service Videotext system, called ESTEL, is now downloaded to seventy farmers.

**   Minnesota Cooperative Extension Service is testing a computerized consumer information database which is used by volunteers to answer questions from farmers, producers, and rural residents that normally require the assistance of a county agent.

**   "County Agent Update" is one very successful program with the Mississippi CES. State specialists come to a studio every Friday morning to discuss growing conditions in the state. The session is taped, duplicated, and distributed to all 82 county offices by the following Monday.

**   New York has received a special grant to develop a videotext project.

**   The Oklahoma Cooperative Extension Service plans to deliver up to thirty video teleconferencing programs via satellite this year.

**   Pennsylvania is planning to open access to the Pennsylvania Extension Network (PEN) to clientele in the fall/winter of 1985. Any client in the state with a terminal or microcomputer and a modem, will be able to dial in and access computer based information.

**   The Puerto Rico Cooperative Extension Service has received a three year grant from the W.K. Kellogg Foundation to develop an agricultural information delivery system using microcomputers.

**   A videotex-oriented information delivery system is planned by the South Carolina Cooperative Extension Service.

**   The Washington Cooperative Extension Service processes all 4-H records centrally, and reports that it has developed a microcomputer-based program for managing records for the Expanded Food and Nutrition Program (EFNEP). The source code is available upon request.

**   Wisconsin CES is testing the use of television signal to transmit data to remote users. The project is called "Info-Text".

**   Wisconsin has also developed "F-chart", a solar heating analysis program.

**   West Virginia CES developed a computer program used to contruct a
      linear programming model involving a trans-shipment analysis of
      the U.S. soybean processing industry.

**   Funded by ES-USDA with Residue Avoidance Program funds from the
      Food Saftey and Inspection Service, the Food and Animal Residue
      Avoidance Databank (FARAD) is now available for nationwide use.
      Five states participated in the development of FARAD, including
      California, Florida, Idaho, Illinois, and North Carolina.

**   Developed at Purdue University through a cooperative agreement
      with USDA, the National Pesticide Information Retrieval System
      (NPIRS) describes all registered pesticide products. Extension
      Service and Cooperative State Research Service are the prime
      supporters of this system.

CONCLUSIONS

State responses to ES-USDA's survey show tremendous growth in the use of and awareness of different forms of electronic technology. Newer technologies are being merged with long-standing systems such as the telephone, radio, and television. By far, the medium with the most opportunity currently for implementation of Extension program and educational delivery and problem solving is the microcomputer. While states are acquiring hardware as their budgets allow, there is still a lack of quality, applicable software in the private sector for Extension use. As a result, many Extension Services are developing software packages as needed. And as high quality packages are developed and documented, multi-state multi-disciplinary use occurs rapidly.

Where Extension has access to other forms of technology, at USDA, on the land grant campus, or in the community, that technology is being adopted for information dissemination. Use of satellites for audio and video teleconferencing for Extension is occurring in places where satellite hook-up is already available. Cable television is accessed in areas where the Extension connection with the cable TV stations is a possibility.

The future is happening at a very fast pace throughout the Cooperative Extension System. The future Extension professionals and their offices are envolving rapidly. Readers are encouraged to analyze the future scenario section of the report, "Electronic Technology: Impact on Extension Delivery Systems" (May, 1985). Imagine what the future will look like; then plan for its eventuality.